NORTH PACIFIC OCEAN

By WILLIS E. HURD

Atmospheric pressure.—There was an unusually large range in atmospheric pressure for the season over central longitudes of the North Pacific Ocean during May, 1932, the average pressure being two-tenths of an inch below the normal over the central Aleutians, and a tenth of an inch above at Midway Island. Numerous LOWS disturbed the northern part of the ocean during the month and in effect resulted in a strong and unseasonably well developed continuation of the Aleutian cyclone, with average center at or near Dutch Harbor, where the monthly mean was 29.63 inches.

In middle latitudes the Pacific anticyclone was likewise unusually well developed for the month, and few depressions formed to disturb the region between 20° and 40° N., except in the Far East, where the usual succession of HIGHS and LOWS prevailed.

TABLE 1.—*Averages, departures, and extremes of atmospheric pressure at sea level, North Pacific Ocean and adjacent waters, May, 1932, at selected stations*

Stations	Average pressure	Departure from normal	Highest	Date	Lowest	Date
	Inches	*Inch*	*Inches*		*Inches*	
Point Barrow [1]	30.10	+0.01	30.34	1	29.86	5
Dutch Harbor [1 2]	29.63	−0.21	30.28	28	28.78	20
St. Paul [1 2]	29.67	−0.17	30.16	28	29.04	4
Kodiak [1]	29.77	−0.07	30.16	[3] 28	28.94	5
Juneau [4]	29.97	−0.02	30.44	27	29.56	5
Tatoosh Island [4 5]	30.09	+0.08	30.40	14	29.68	29
San Francisco [4 5]	29.99	0.00	30.26	22	29.74	6
Mazatlan [1 2]	29.87	−0.05	30.02	13	29.76	6
Honolulu [4]	30.08	+0.03	30.16	19	29.97	27
Midway Island [1]	30.17	+0.12	30.32	10	29.94	2
Guam [1 2]	29.88	0.00	29.98	[3] 9	29.76	17
Manila [1]	29.81	−0.04	29.92	11	29.74	[3] 14
Naha [1 2]	29.89	+0.07	30.02	16	29.68	24
Chichishima [1 2]	30.01	+0.10	30.16	18	29.86	6
Nemuro [6]			30.28	15	29.46	[3] 22

[1] Data based on 1 daily observation only, with departures computed from best available normals related to time of observation.
[2] Data for 1 to 6 days missing.
[3] And on one other date.
[4] Data based upon a. m. and p. m. observations.
[5] Corrected to 24-hour mean.
[6] Data for 21 days only; average not computed.

Cyclones and gales.—Only one cyclone of major importance is known to have occurred on the North Pacific during the month. This was the typhoon of April 29–May 5 which, after crossing the Sulu Archipelago, where it did considerable damage in April, crossed the China Sea and damaged the coast of Indo-China, with great loss to life, on May 4. The typhoon was of little width, but great intensity. It is fully described in the subjoined article by the Rev. Miguel Selga, S. J., director of the Philippine Weather Bureau. A report from the American motor ship *Crown City*, which encountered the storm on May 2 and 3 near 10° N., 112° E., shows that the vessel rode out storm to hurricane velocities (forces 11–12) from midnight until noon of the 3d.

Despite the average pressure alignment, which would seem to have resulted in an abnormal amount of storminess for May over northern waters, close to the normal percentage of gales occurred. Other than those attending the tropical cyclone, but few gales, and those not reported as exceeding force 8, occurred south of the fortieth parallel. North of this parallel, in the more disturbed parts of the ocean, scattered gales, mostly of forces 8–9, were experienced on several days, and of force 10, on two days, the 1st and 14th, these latter in the western part of the steamship routes. The heaviest gales in general were reported from middle and western localities in northern waters. On the 7th, during a strong gale, snow fell east of the Kuril Islands.

In the Gulf of Tehuantepec northers of moderate force 7 were experienced on the 2d, 14th, and 19th.

The accompanying table of gales and storms shows the complete list of winds exceeding force 7 that have been reported up to this writing as occurring during May.

Winds at Honolulu.—The prevailing wind direction at Honolulu was from the east; the maximum velocity was 29 miles from the northeast on the 15th.

Fog.—Over the main body of the ocean north of the thirtieth parallel fog increased considerably over its occurrence in April. The percentage of frequency in these latitudes, however, did not exceed 10, except north of the fortieth parallel, where in localities, particularly southeast of the Kuril Islands and at 40°–45° N., 140°–145° W., it was observed on 30 to 35 per cent of the days. Fog along the American coast was comparatively infrequent, occurring on only 2 or 3 days in United States waters. Off the west coast of the peninsula of California it was found on 6 days.

THE TYPHOON OF JOLO—INDO-CHINA, APRIL 29–MAY 5, 1932

By Rev. MIGUEL SELGA, S. J.

[Weather Bureau, Manila, P. I.]

A typhoon of considerable intensity crossed the Sulu Archipelago on April 29, causing a heavy loss of life and property.

At 6 a. m. on April 29 the barometer of Jolo was not lower than 755.70 mm; the wind was from the north, force 3 only; the sky was overcast, but no rain. As an officer of the motor ship *Rizal* anchored at Jolo expressed it, "Even until 11 o'clock a. m. everything was serene, and the sea betrayed no sign of fury." By 2 o'clock p. m. the barometer was falling at a rapid rate; the wind had increased to force 7; large waves from the north were dashing against the pier and against the numberless houses built by the Chinese close to shore and over low water. At 6 p. m. the barometer took a precipitous drop; the wind veered to north-northeast and increased to force 8. Throughout the evening until about 11 p. m. fierce winds blew over the town, ranging in velocity from 32 to 63 miles per hour. The barometric minimum, 743.17 mm, took place at 6.50 p. m.; shortly before and after that moment the wind was blowing a whole gale. Nipa roofs and houses of light materials gave in; sheets of galvanized iron were uplifted from roofs and blown away with great danger to life; houses collapsed; the telegraph and telephone lines became a mass of entangled wire; trees were uprooted, blocking roads and streets; huge waves washed away vintas, paraos, and houses along the shore. The motor ship *Rizal* pulled out from the pier and rode out the storm a mile out at sea, with two anchors and a full head of steam all the time. The steamship *Islas Filipinas*, which preferred to remain tied up at the pier, broke loose from her moorings and ran aground near the Chinese pier. The motor ship *Remedios*, which was tied up at a small wharf, also broke loose from her moorings, was literally snapped in two by the terrific buffeting of the waves, and sank with the loss of three lives. Fully three-quarters of the town of Jolo was completely demolished. In the municipal district of Jolo, whose population was estimated at 7,000 in 1932, 2,500 persons were rendered homeless and 2,835 destitute. The historic Chinese pier, extending on huge

wooden piles several hundred feet into the harbor, was wiped out, with its store shops and Chinese houses. The palace of the sultan was destroyed. The Spencer school buildings were demolished, all except the dormitory. Mrs. C. S. Spencer, a New York philanthropist, founder and administrator of the school, was seriously injured when her palatial home collapsed, and she was pinned under a teakwood post 10 inches square and weighing several hundred pounds. To liberate Mrs. Spencer from under the teak post it took four men one hour to saw through the post in the darkness, with the help of a flashlight only. "Every mine worker the world over," said Mrs. Spencer, "has now my sympathy and understanding of what it means to have your body held for hours in immovable agony with your mind perfectly active all the time."

The center of the storm very likely did not touch the island of Jolo proper, but passed over the small island of Pata, where a calm of 15 minutes was observed, and the wind shifted rapidly from north-northwest to southeast.

When the typhoon passed south of the Samales group and south of Jolo Island, it had a very strong westerly component. Inclining more to the west-northwest, it passed south of North Ubian Island shortly before midmight of the 29th and very close to and by the south of Cagayan de Sulu at 2 p. m. of the 30th. The wind, which at Cagayan de Sulu had been from the northeast the whole morning, veered to east-southeast at 2.30 p. m., to southeast at 3 p. m., and to south at 5 p. m. The strongest winds were from east-northeast between 1 p. m. and 2.30 p. m. At 4 p. m. the winds from the southeast are said to have died down to about half a gale. The mountainous waves raised by the typhoon destroyed the pier.

According to reliable information, the losses caused by the typhoon in Cagayan de Sulu were as follows: 5 lives lost; 15 persons injured, 10 commercial houses destroyed, 807 residential buildings destroyed, 104 head of cattle killed, 170,000 coconut trees bearing fruit and 100,000 not yet bearing destroyed, and about 7,000 persons homeless.

Following its west-northwest course the typhoon crossed the Balabac Strait on the evening or night of the 30th, probably very close to Banguey Island.

The diameter of the storm was so small that once the typhoon was in the China Sea the isobars of the weather map were insufficient to circumscribe its center. Manila Observatory was compelled to broadcast on May 1 that owing to lack of observations it was impossible to ascertain whether the Jolo typhoon had filled up or was still raging over the southern part of the China Sea. The observations of the ship *Atrews* copied from her log book upon arrival at Manila show that in crossing the China Sea the storm had maintained its intensity. The ship was bound from Singapore to Manila and was navigating N. 37 E. At 7.15 a. m. on May 3, the course was changed to N. 30 W., since the barometer had dropped 5 mm in the last five hours with every indication of a typhoon approaching by the north. At 8 a. m. while the ship was in latitude 9° 51′ and longitude 110° 12′, the barometer read 746.8 mm, the northwest wind increased to force 9 and the sea was running very high. From 9.30 a. m. to 5 p. m. a course to south-southwest was maintained. The barometric minimum of 742.9 was experienced at 9.30 a. m. with winds from the west, force 10. The wind backed to west-southwest, southwest, and southeast, but blew with force 10 for five hours at least. With the passing of the storm north of the ship the weather moderated and by midnight the barometer had risen to 754.9 and the south-southeast wind had abated to force 5.

Unrelenting in its strength the storm entered Cochinchina between Phanrang and Phanthiet, a few miles south of Cape Pandaran on Wednesday, May 4. A press dispatch reported over 500 victims of the storm in Annam. The Jolo typhoon will go down in history as a freak cyclone, less than 20 kilometers in diameter, traveling at a mean speed of 13 kilometers per hour, which caused the death of 147 persons in the Sulu Archipelago and of 500 at least in Indo-China. The damage to private property in the Sulu Archipelago alone amounted to 5,000,000 pesos.